IN THE DRAWINGS:

Please replace the drawings with the drawings attached herewith, a copy of which is also being submitted as formal drawings in a separate communication filed today.

REMARKS

Claims 1-48 are pending and at issue in the present application. Claims 27-43 and 46-48 are allowed. The Office Action has objected to claims 2, 6, 7, 9, 10, 12, 13, 16, 18, 19, 21, 24 and 26, but indicated that these claims would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The remaining claims stand rejected under a single prior art rejection, an obviousness rejection based on Bloom et al. (USPN 5,311,360) in combination with Asakawa et al. (USPN 5,892,598). Additionally, the specification has been objected to, along with the drawings. These latter two objections have been obviated by the above amendment, and reconsideration is thus respectfully requested. The amendment to the specification also corrects an erroneous reference in the fourth sentence.

Turning to the prior art rejection, claim 1 recites an optical switch having "a substrate for transmitting an optical signal within the substrate, where said optical signal propagates in the substrate in a first direction under total internal reflection." The optical switch further includes "a diffractive optical element disposed above the top surface of the substrate and moveable relative thereto." None of the prior art teaches the claimed combination.

The Office Action points to the structure 16 of Bloom et al. as teaching "a substrate for transmitting an optical signal within the substrate." It does not. Although Bloom et al. do use the term "substrate" in reference to the structure 16, the document is clear that no optical signal propagates in that structure. Instead, the "substrate 16" merely functions as a structural support. As shown in figures 3 and 4, in the Bloom et al. devices, the selectively reflected or diffracted signal 26 is an external signal, i.e., one incident from an air region and reflected back into that same air region. The signal never enters the substrate 16 and is indeed prevented from doing so by the reflective layers 22 covering the elements 18 and the 'substrate' portions therebetween. The statement in the Office Action that Bloom et al. teach "a substrate for transmitting an optical signal within the substrate," as recited in claim 1, appears to be a misreading of that reference.

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The Office Action's misreading of Bloom et al. is further demonstrated by the suggested combination of that document with Asakawa et al. As an initial matter, the applicants note that to establish a *prima facie* case of obviousness, there must be some teaching, suggest, or motivation from the prior art to make the proposed combination or modification. One cannot rely upon the mere fact that references can be combined or modified, unless the prior art also suggests the desired combination. MPEP §2143.01 *citing* In re Mills, 916 F.2d 860 (Fed. Cir. 1992). As explained by the Federal Circuit in In re Rouffet:

> As this court has stated, "virtually all [inventions] are combinations of old elements." Therefore, an examiner may often find every element of a claimed invention in the prior art. If identification of each claimed element in the prior art were sufficient to negate patentability, very few patents would ever issue...To prevent the use of hindsight based on the invention to defeat patentability of the invention, this court requires the examiner to show a motivation to combine the references that create the case of obviousness. In other words, the examiner must show reasons that the skilled artisan, confronted with the same problems as the inventor and with no knowledge of the claimed invention, would select the elements from the cited prior art references for combination in the manner claimed.

In re Rouffet, 47 U.S.P.Q.2d 1453, 1457 (Fed. Cir. 1998) (citations omitted and emphasis added). As further explained in the In re Rouffet decision:

> This court has identified three possible sources for a motivation to combine references: the nature of the problem to be solved, the teachings of the prior art, and the knowledge of persons of ordinary skill in the art. In re Rouffet. at 1458.

The Office Action points to none of these sources for a suggestion to make the proposed combination and, therefore, is legally flawed and improper.

Furthermore, not only has no suggestion to combine been made, none could be made. For example, Bloom et al. teach away from using "a substrate for transmitting an optical signal within the substrate, where said optical signal propagates in the substrate in a first direction under total internal reflection," as recited in claim 1. The Bloom et al. patent is directed to modulating a light beam incident from an air region. As is known to persons of ordinary skill in the art, total internal reflection only occurs when the index of refraction of the incident medium is higher than the index of refraction of the adjacent medium. In other

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words, total internal reflection cannot occur when light is incident from an air region like that of Bloom et al. In fact, the loss associated with passing light through an optical substrate, as opposed to a lossless air region, would appear to controvert Bloom et al.'s desirability for a high contrast, and low loss, optical modulator. (See, col. 3, ll. 10-17). Furthermore, total internal reflection may only occur at an acute angle of incidence, whereas Bloom et al. relies upon a normal angle of incidence, from which total internal reflection may not occur.

There is also no teaching in Asakawa et al. to make the suggested combination. Asakawa et al. nowhere suggest using their light irradiating head-up display unit in an optical modulator environment such as that of Bloom et al. Although Asakawa et al. describe a substrate with a diffraction grating in Figure 6, that structure is a uniform light source for the head-up display. There is no suggestion to use that structure to modulate light, and indeed modulation would be appear to be antithetical to the desirability of forming a uniform light source.

In sum, the Office Action has pointed to none of the requisite sources for a *prima facie* case of obviousness and the rejection is improper. The rejections of claim 1 and claims 3-5, 8, 11, 14, 15, 17, 20, 22, 23, and 25 depending therefrom are respectfully traversed and reconsideration requested.

Turning to claim 44, that claim recites a 1XN optical switch having "a substrate for transmitting an optical signal within the substrate, where said optical signal propagates in the substrate in a first direction under total internal reflection." The optical switch further includes "N diffractive optical element disposed above the top surface of the substrate and each moveable relative to the substrate." Claim 44 recites similar subject matter to claim 1. Thus, for the reasons provided in the foregoing, the rejections of claim 44 and claim 45 depending therefrom are improper and respectfully traversed. Reconsideration is requested.

In view of the above, each of the presently pending claims in this application is believed to be in immediate condition for allowance. Accordingly, the Examiner is respectfully requested to pass this application to issue.

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Attached hereto is a marked-up version of the changes made to the specification and claims by the current amendment. The attached page is captioned **"Version with markings to show changes made."**

Dated: March 26, 2003

Respectfully submitted,

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Version with markings to show changes made

IN THE SPECIFICATION:

Please delete the paragraph on page 6, lines 15-27 with the following paragraph:

By way of background and to explain the general operation of HOEs used with optical substrates, FIG. 1 shows a cross-sectional view of an HOE 100. The HOE 100 is described in detail in co-pending application entitled "Integrated Transparent Substrate and Diffractive Optical Element", Serial No. 09/905,769 [_____], filed on July 13, 2001 [_____], assigned the same inventors, which is incorporated herein by reference. The HOE 100 is disposed on an optical substrate 102, which in the preferred embodiment is optically transparent in the infrared region at least around 1550 nm or 1310 nm (vacuum wavelength), transmission wavelengths desirable for optical communications. The [HOE 100] substrate 102 could be optically transparent at any desired wavelength, however. The substrate 102 may be made of a quartz material or another substrate material suitable for propagating a signal under TIR and for serving as an etch-stop surface for a photolithography process. In the preferred embodiment, the substrate 102 is made of sapphire.

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